Kansas Agricultural Experiment Station Research Reports

Volume 4
Issue 6 *Turfgrass Research*

Article 6

2018

Brown Patch Occurrence in a Zoysiagrass-Tall Fescue Polystand Compared to a Tall Fescue Monostand

Mingying Xiang
Kansas State University, mxiang@ksu.edu

Jack D. Fry
Kansas State University, jfry@ksu.edu

Megan M. Kennelly
Kansas State University, kennelly@ksu.edu

Recommended Citation

Xiang, Mingying; Fry, Jack D.; and Kennelly, Megan M. (2018) "Brown Patch Occurrence in a Zoysiagrass-Tall Fescue Polystand Compared to a Tall Fescue Monostand," *Kansas Agricultural Experiment Station Research Reports*: Vol. 4: Iss. 6. https://doi.org/10.4148/2378-5977.7596

Brown Patch Occurrence in a Zoysiagrass-Tall Fescue Polystand Compared to a Tall Fescue Monostand

Abstract

Research has demonstrated that polystands of zoysiagrass and tall fescue can be established successfully, with the potential to provide a high quality turfgrass stand with reduced inputs. Our objective was to determine whether mixing zoysiagrass with tall fescue will reduce brown patch severity while maintaining overall acceptable quality. Studies were established at the Rocky Ford Turfgrass Research Center in Manhattan, KS. In the split-plot design, natural infection by *Rhizoctonia solani* or a fungicide-treated control was the whole plot treatment factor and species (tall fescue monostand and the zoysiagrass/tall fescue mixture) were subplots. During July and August 2016 and 2017, when hot, humid weather triggered brown patch, excessive irrigation was applied to promote brown patch. Disease severity was measured by visual ratings and digital image analysis; number of leaves in each plot that were infected was recorded using a grid. The mixed stand then showed less plot area affected by brown patch disease compared to the monostand of tall fescue.

Keywords

Disease, turfgrass, mixture

Cover Page Footnote

Contribution number 18-630-S.

Turfgrass Research
2018

K-STATE TURFGRASS RESEARCH

JULY 2018

Brown Patch Occurrence in a Zoysiagrass-Tall Fescue Polystand Compared to a Tall Fescue Monostand

Mingying Xiang, Jack D. Fry, and Megan M. Kennelly

Summary

Research has demonstrated that polystands of zoysiagrass and tall fescue can be established successfully, with the potential to provide a high quality turfgrass stand with reduced inputs. Our objective was to determine whether mixing zoysiagrass with tall fescue will reduce brown patch severity while maintaining overall acceptable quality. Studies were established at the Rocky Ford Turfgrass Research Center in Manhattan, KS. In the split-plot design, natural infection by *Rhizoctonia solani* or a fungicide-treated control was the whole plot treatment factor and species (tall fescue monostand and the zoysiagrass/tall fescue mixture) were subplots. During July and August 2016 and 2017, when hot, humid weather triggered brown patch, excessive irrigation was applied to promote brown patch. Disease severity was measured by visual ratings and digital image analysis; number of leaves in each plot that were infected was recorded using a grid. The mixed stand then showed less plot area affected by brown patch disease compared to the monostand of tall fescue.

Rationale

Hot summers and cold winters make it difficult to grow cool- and warm-season turfgrasses, respectively. Tall fescue is used frequently in Kansas due to its heat and drought tolerance compared to some other cool-season grasses. Brown patch caused by the fungus *Rhizoctonia solani* Kühn AG-2-2 IIIB is the main disease limiting the growth of tall fescue in summer, and brown patch resistance in tall fescue cultivars is limited. Zoysiagrass is a warm-season grass with better heat and drought tolerance compared to cool-season grasses, and it may be a good mixture partner with tall fescue. Previous research has demonstrated that a zoysiagrass and tall fescue mixture

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

can be established successfully, with the potential to provide a high quality turfgrass stand with reduced inputs. From an epidemiological standpoint, polystands of species or cultivars decrease the rate of disease spread compared to monostands.

Objective

The objective of this research was to determine whether mixing zoysiagrass with tall fescue would reduce brown patch severity while maintaining overall acceptable quality in Kansas.

Study Description

Studies were established at the Kansas State University Rocky Ford Turfgrass Research Center in Manhattan, KS. In the split-plot design, natural infection by *R. solani* or a fungicide-treated control was the whole plot treatment factor and species (tall fescue monostand and the zoysiagrass/tall fescue mixture) were subplots. Whole plots measured 10 × 10 ft and were replicated four times. Sub plots were 5 × 5 ft and there were two sub-plot replicates within each whole plot. 'Compadre' zoysiagrass was seeded in the zoysiagrass/tall fescue mixture plots at Rocky Ford at 1 lb pure live seed (PLS) /1,000 ft^2 on June 25, 2015. 'Corona' tall fescue was seeded at 4 lb of PLS /1,000 ft^2 in the mixture plot immediately after seeding zoysiagrass. On September 17, 2015, Corona tall fescue was seeded at 7 lb of PLS /1,000 ft^2 to establish the monostand tall fescue plots. The plots seeded the previous spring to the zoysiagrass and tall fescue mixture were overseeded with tall fescue at 2 lb of PLS /1,000 ft^2. Before seeding, the plots were verticut in two directions using a Bluebird verticutter. On May 24, 2016, brown patch (*R. solani* AG-2-2 IIIB) was observed in the tall fescue monostand plots, and a granular mixture of pyraclostrobin and triticonazole was applied to the subplots (3 lb/1,000 ft^2 of Pillar G Intrinsic, BASF, Research Triangle Park, NC). On June 29, 2016, a mixture of 14.3% propiconazole at 2 oz/1,000 ft^2 of Lesco Spector Ultra 1.3 fungicide (LESCO, Inc., Cleveland, OH) and 50% Azoxystrobin at 0.4 oz/1,000 ft^2 from Heritage 50 WG (Syngenta Crop Protection LLC Greensboro, NC). On July 19, 2016, 50% Azoxystrobin at 0.4 oz/1,000 ft^2 from Heritage 50 WG was applied to the subplots. In 2017, azoxystrobin at 1.25 lb/1,000 ft^2 (Heritage G, Syngenta Crop Protection LLC P.O. Greensboro, NC) was applied on May 29, June 19, July 11, August 2 and 25. During the disease season, excessive irrigation was applied daily between 7:00 and 9:00 p.m. to create leaf wetness to promote brown patch.

Brown patch severity was rated visually biweekly on percentage of each plot affected by disease. In addition, patch symptoms were evaluated by taking digital images with a light box. All data were subjected to analysis of variance using the GLIMMIX procedure of SAS. Fisher's protected least significant difference (LSD) ($P \leq 0.05$) was used to detect treatment differences.

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

K-STATE TURFGRASS RESEARCH

Results

On August 4, 2016, the day with highest disease pressure, brown patch as determined by visual rating for the tall fescue monostands, was 14%; whereas, the zoysiagrass mixture had only 3% brown patch (Figure 1). On August 30, 2017, the tall fescue monostand exhibited 12% brown patch, while the mixture had less than 6% brown patch when the disease was rated visually (Figure 2). Overall, mixing zoysiagrass with tall fescue resulted in consistently less brown patch compared to the monostand of tall fescue (Figure 3).

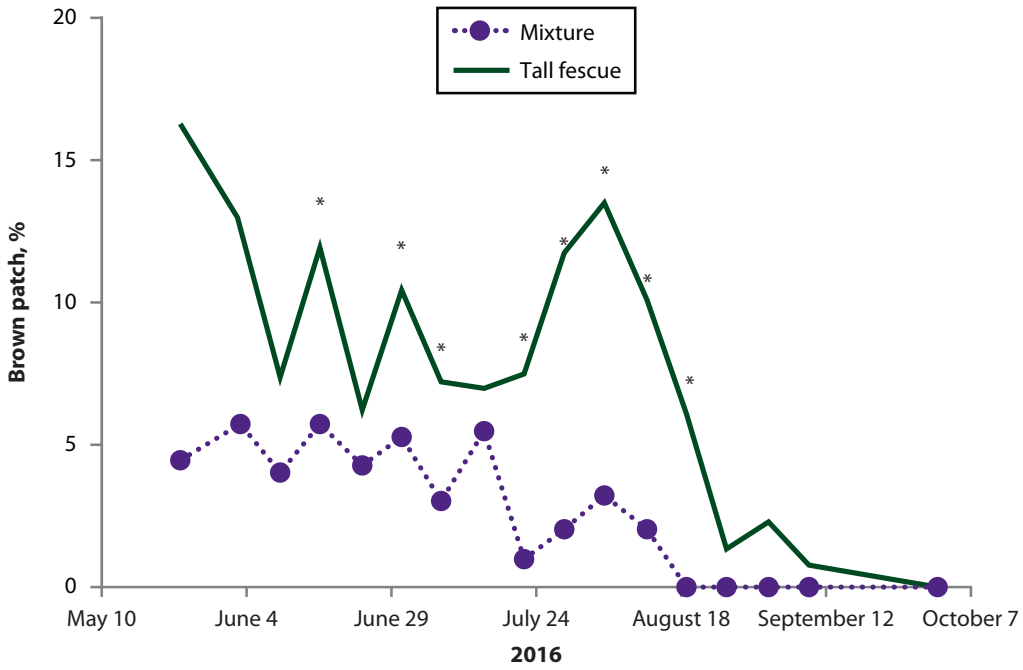

Figure 1. Brown patch in a zoysiagrass/tall fescue mixture vs. a tall fescue monostand on the non-fungicide treated plots in Manhattan, KS, in 2016. Presence of an asterisk denotes that means are significantly different ($P \leq 0.05$).

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

K-STATE TURFGRASS RESEARCH

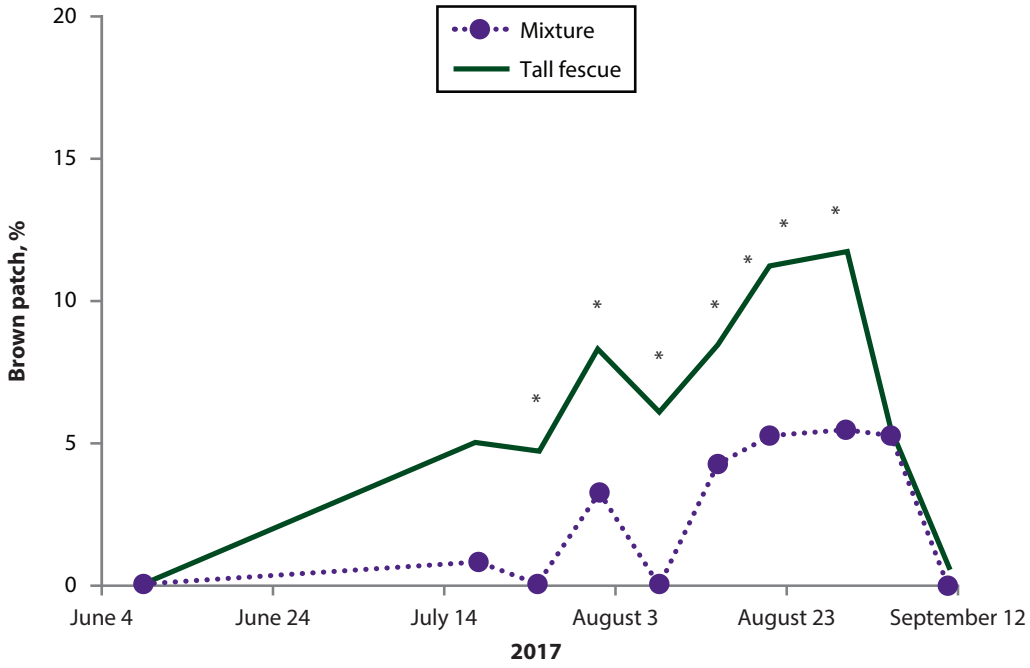

Figure 2. Brown patch in a zoysiagrass/tall fescue mixture vs. a tall fescue monostand on the non-fungicide treated plots in Manhattan, KS, in 2017. Presence of an asterisk denotes that means are significantly different ($P \leq 0.05$).

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

K-STATE TURFGRASS RESEARCH

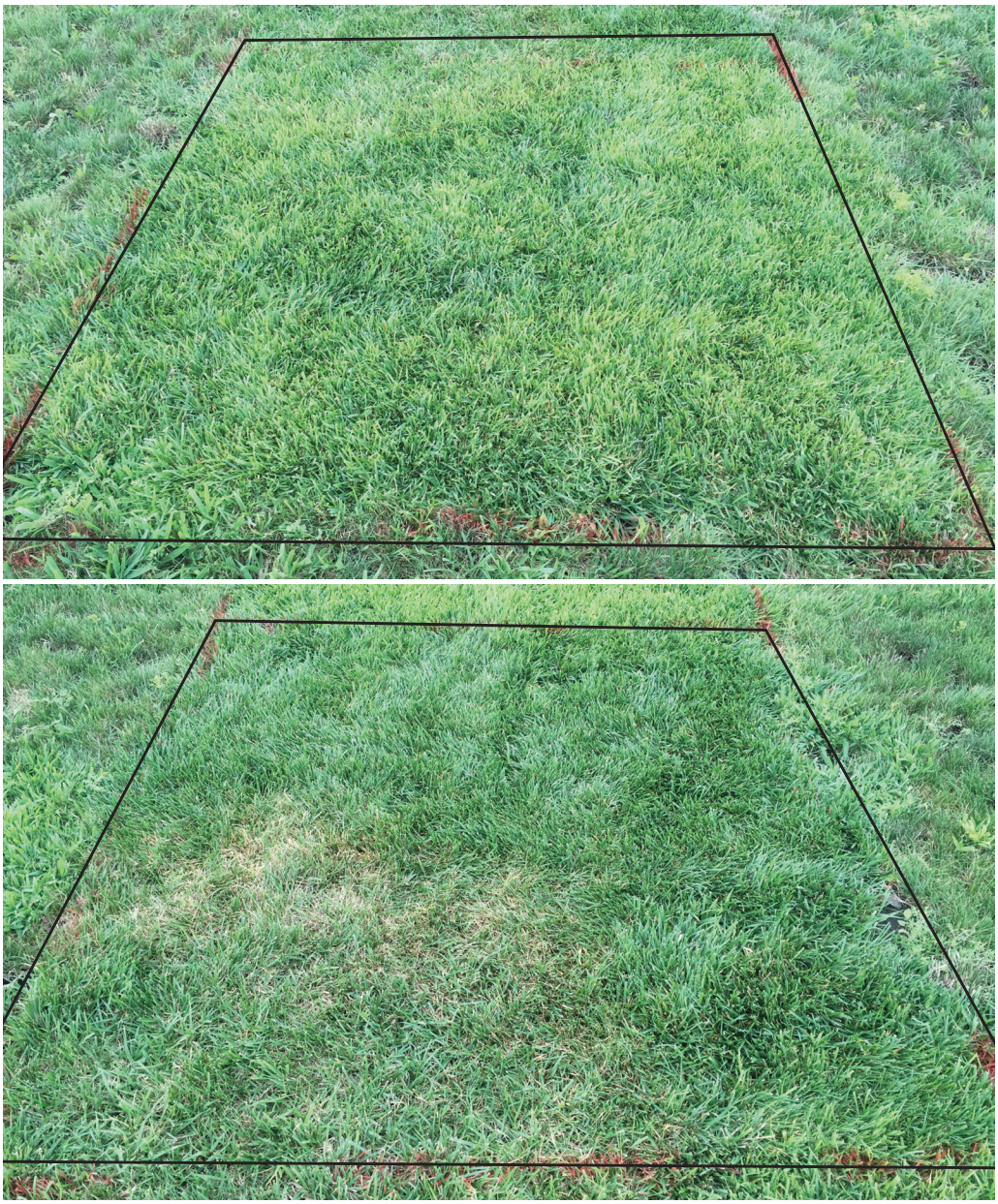

Figure 3. Brown patch in the zoysiagrass/tall fescue mixture (top picture) compared to the tall fescue monostand (bottom picture) in August 2016 in Manhattan, KS.

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service